REMARKS

Applicants respectfully request entry of the foregoing and reconsideration of the subject matter identified in caption, pursuant to and consistent with 37 C.F.R. §1.112, and in light of the remarks which follow.

Claims 66-175 are pending in the application.

Applicants thank the Examiner for acknowledging entry of the Amendment filed on November 21, 2003. In addition, Applicants thank the Examiner for the courtesies extended to their representative Martin A. Bruehs during the personal interview on April 29, 2004. In particular, Applicants thank the Examiner for indicating that he would give favorable consideration to Applicants' remarks.

Turning now to the Official Action, Claims 66-117 and 147-175 stand rejected under 35 U.S.C. §102(b) as being anticipated by Tirpak (U.S. Patent No. 5,300,556). For at least the reasons that follow, withdrawal of the rejection is in order.

Claim 66, as presented above, recites a process for preparing an oil-in-water emulsion of blocked (polyisocyanates), the process comprising: conducting a one-step emulsifying-and-blocking reaction by placing an isocyanate composition comprising free isocyanate functions in contact with at least one blocking agent A in the presence of a surfactant B and an aqueous phase, the isocyanate composition being added gradually to a stock containing at least some of the aqueous phase and at least some of the blocking agent so that the content of free isocyanate functions is equal to not more than two equivalents per kilogram in the isocyanate phase. (Emphasis added.)

Claim 155, as presented above, recites a composition comprising a blocked polyisocyanate emulsion, comprising a hydrophilic part formed of an anionic function

selected from the group consisting of a phosphate, a phosphonate, and a phosphinate group, and at least one of a polyethylene glycol chain fragment and a polypropylene glycol chain fragment, and a lipophilic part selected from the group consisting of an alkyl group and an aryl group, wherein the composition comprises less than 50 percent, by mass, of water, relative to the emulsion. (Emphasis added.)

The Official Action takes the position that Tirpak discloses the instantly claimed methods, compositions, method of coating, and coating. The Official Action further asserts that the instant claims require blocked polyisocyanates, and that the dispersion of blocked polyisocyanate, emulsifier, and water falls within the scope of emulsion. The Official Action also asserts that the patentee encompasses adding the isocyanate to an aqueous composition of surfactant and blocking agent (column 6, lines 3-7 and 50-52) which falls within the scope of the instantly claimed one-step emulsifying and blocking reaction. Thus, the Official Action concludes that since all of the NCO is reacted by the patentee, the free NCO content of the instant claims is met. (See Official Action at paragraph 4, pages 2 to 3).

Tirpak relates to an improved process for the preparation of aqueous dispersions containing both blocked polyisocyanates and polyhydroxyl compounds. (See Tirpak at column 1, lines 10-15.)

It is well established that in order to demonstrate anticipation under §102(b), each element of the claim at issue must be found, either expressly described or under the principles of inherency, in a single prior art reference. See *Kalman v. Kimberly-Clark Corp.*, 218 U.S.P.Q. 789 (Fed. Cir. 1983). That is not the case here.

For example, Tirpak does not disclose or fairly suggest a process for preparing an oil-in-water emulsion of blocked (poly)isocyanates, which comprises a

content of free isocyanate functions equal to not more than 2 equivalents per kilogram in the isocyanate phase. Specifically, at column 2, line 22, Tirpak states: "Prior to being dispersed in water, the polyisocyanates have an isocyanate content of at least about 12%, preferably at least about 15% and more preferably at least about 20% by weight, based on the weight of the polyisocyanate. Polyisocyanates having a lower isocyanate content and prepared, e.g., by reacting a monomeric polyisocyanate with a high molecular weight polyol, have sufficiently high viscosities that it is difficult to disperse them in water even if they are hydrophilically modified." (Emphasis added) (See Tirpak at column 2, lines 22-31.) Accordingly, Applicants submit that Tirpak does not disclose or fairly suggest a process like that recited in independent Claim 66, which includes a low isocyanate level. In fact, Tirpak discloses that the isocyanate level must be at least 12% and more preferably at least more than 20% by weight to achieve sufficient dispersion in water. (Emphasis added)

In addition, Tirpak fails to disclose or fairly suggest conducting a one-step emulsifying-and-blocking reaction by placing an isocyanate composition comprising free isocyanate functions in contact with at least one blocking agent A in the presence of a surfactant B and an aqueous phase. Specifically, in addition to failing to disclose a one-step reaction, Applicants submit that Tirpak also fails to disclose or suggest the order recited in independent Claim 66. That is, Tirpak does not disclose or suggest adding the isocyanate to the aqueous phase, as claimed. In particular, the disclosure at column 6, lines 50-52, states: "The blocking agent and polyhydroxyl compound may be added to the water either before, during or after the polyisocyanate has been dispersed." (Emphasis added) Thus, Applicants submit

that Tirpak clearly does not disclose or suggest conducting the addition of the isocyanate in any particular order. Certainly, from this statement, a person of ordinary skill in the art would not have been motivated to gradually add the isocyanate to a stock containing at least some of the aqueous phase and at least some of the blocking agent, as claimed in independent Claim 66. (Emphasis added) That is, in addition to failing to disclose the specific order of the addition, Tirpak also fails to disclose the gradual addition of the isocyanate. Applicants submit that the rate of addition is also significant because rapid addition of isocyanate can result in an emulsion where some isocyanate functions react with water of the aqueous phase. This is taught by Tirpak at, for example, column 5, lines 31-37, which states: "...Because of the large molar excess of hydroxyl groups available from water compared to the hydroxyl groups available from the polyhydroxyl compounds, most of the isocyanate groups which are not blocked will react with water." (Emphasis added)

The process of Claim 66 specifies that the content of free isocyanate functions is equal to not more than 2 equivalents per kg in the isocyanate phase. (Emphasis added) In this regard, Applicants note that the Official Action asserts that the free NCO content of the claims is met by the disclosure of Tirpak. However, Applicants submit that a low free NCO content is not the same as substantially all of the NCO being reacted. That is, in the emulsion made using the claimed process, Applicants submit that almost all NCO is blocked (i.e., protected). In contrast, Tirpak discloses that some NCO may be blocked and some may be reacted. In particular, column 5, lines 31-32 states "any isocyanate groups which are not blocked by the blocking agent may be left to react with water or the polyhydroxyl compound."

(Emphasis added) This interpretation of Tirpak is further supported by the Examples presented in the specification of Tirpak. Specifically, Example 1 is directed to the preparation of a modified polyisocyanate with a mono-functional poly(ethyleneoxide)ether. Additionally, Examples 2-4 used the Example 1 modified polyisocyanate, which is dispersed in water, and to which is then added a diol and a blocking agent. In each of the Examples 2-4, a large amount of water, 1,4-butanediol and MEKO is added to the water-dispersible polyisocyanate of Example 1 in the following proportions:

Compound (Molecular weight)	Weight	Number of moles	Number of function equivalent
Polyisocyanate of Example 1 Having 20.42% NCO (NCO=42 g)	125g	-	0.607
1,4-butanediol (90 g)	27.32	0.3035	0.607
MEKO (87 g)	52.82	0.607	0.607

From the above information, it is clear that the equivalent number of blocking function is always the same as the equivalent number of hydroxyl functions and as the equivalent number of isocyanate functions. Applicants submit that this correlation clearly demonstrates that water, butane diol and MEKO in Tirpak are competing to react with the isocyanate. In other words, Tirpak teaches that some NCO functions may be blocked, others may react with water, and still others may react with the polyol. This is completely contrary to the teaching of the present invention. That is, while the present invention may include adding polyols into the emulsion, in contrast to Tirpak, the polyols used do not interfere with the claimed reaction (see specification at page 33, lines 1-17). For this purpose, the polyols in

the claimed process and emulsion are carefully chosen to avoid those that exhibit pKa values that are incompatible with the requirements of the invention. Suitable pKa values are provided by aliphatic isocyanates that possess a reactivity, which is very different from aromatic isocyanates. (See specification at page 3, lines 13-16).

In addition, with respect to the composition of independent Claim 155, Applicants submit that nowhere does Tirpak disclose or fairly suggest an emulsion that comprises less than 50%, by mass, of water. (Emphasis added) Instead, all of the Examples of Tirpak clearly show that the water content of the disclosed emulsion is more than 50% by mass. This showing is summarized in the following table:

Example #	Organic compounds		Water		Ratio Water / total A + B (weight %)
	Compound	Weight(g)	Compound	Weight (g)	
2	Modified polyisocyanate of Ex. 1	125	Demineralized Water	202.74	
	Butanediol	27.32	Demineralized Water	27.32	
	MEKO	52.82			
	Total A	205.14	**Total B**	230.06	**52.9%**

3	Modified polyisocyanate of Ex. 1	125	Demineralized Water	230.06	
	Butanediol	27.32			
	MEKO	52.82			
	Total A	205.14	**Total B**	230.06	**52.9%**

4	Modified polyisocyanate of Ex. 1	125	Demineralized Water	230.06	
	Butanediol	27.32			
	MEKO	52.82			
	Total A	205.14	**Total B**	230.06	**52.9%**

Accordingly, the objective teaching of Tirpak is an emulsion of polyisocyanates with a water content greater than 50%, wherein some of the NCO functions have already reacted, some of them are blocked, and comprising an amount of a polyhydroxyl compound. Furthermore, the emulsifying and blocking reaction of Tirpak is conducted in the presence of alcohol functions that drastically modify the operating conditions, which are substantially different from those of the present invention. In addition, the ultimate composition of Tirpak is different from that of the present invention in that the composition of Tirpak is a self-curable modified polyisocyanate emulsion (since it already contains polyol compounds, some of which are reacted with a polyisocyanate).

Also, as discussed in the personal interview on April 29, it is believed that Tirpak fails to expressly or inherently describe a composition comprising "a hydrophilic part formed of an anionic function selected from the group consisting of a phosphate, a phosphonate, and a phosphinate group," as set forth in independent Claim 155. Thus, Claim 155 is further distinguished from Tirpak on this basis.

For at least these reasons, Applicants submit that Claims 66 and 155 are patentable over Tirpak because Tirpak fails to expressly or inherently describe each an every element of Claims 66 and 155. The remaining claims (Claims 67 - 117, 147 - 154, and 156 - 175) all depend, directly or indirectly, from independent Claims 66 or 155, and are therefore also patentable over Tirpak for at least the reasons that Claims 66 and 155 are patentable. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §102(b) rejection over Tirpak.

Claims 66-175 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tirpak in view of Yasuda (EP 367667). For at least the reasons that follow, withdrawal of the rejection is in order.

To establish a *prima facie* case of obviousness, the prior art references (or references when combined) must teach or suggest all of the claim elements. See In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). In addition, "all words in a claim must be considered in judging the patentability of that claim against the prior art." See In re Wilson, 424 F.2d 1382, 1385; 165 U.S.P.Q. 494, 496 (CCPA 1970). See MPEP §2143.03.

For at least all of the reasons set forth above, Applicants submit that Claims 66, 118 and 155 also would not have been obvious over Tirpak.

Yasuda fails to overcome the above-identified deficiencies of Tirpak. That is, even when combined with Tirpak, the asserted combination fails to teach or suggest all of the elements of Claims 66, 118 and 155.

Yasuda relates to a new polyurethane resin containing at least one phosphoric acid group and its use in a magnetic coating formulation and a magnetic recording medium. Magnetic recording media can include, for example, magnetic tapes, magnetic disks, magnetic cards and the like. (See Yasuda at page 2, lines 1-3.)

The Official Action asserts that Tirpak discloses the compositions, methods, and coatings as discussed and that it would have been obvious to one of ordinary skill in the art to use the claimed surfactants as the surfactants used by the patentees because Yasuda shows that the surfactants impart desired properties to aqueously dispersed polyurethanes, and because these surfactants would have

been expected to impart the properties to the above-discussed emulsions or the surfactant of Yasuda is used as the surfactant in Tirpak.

However, Yasuda fails to disclose or suggest using the phosphorus compound as an emulsifying compound. In fact, Applicants submit that Yasuda fails to even suggest the possibility of an emulsifying agent that would be compatible with polyurethanes. A careful and appropriate interpretation of Yasuda reveals that it only suggests using the disclosed phosphorous compound for opening epoxy rings. See, for example, Yasuda at page 2, lines 35-37, which states "...this new phosphoric-acid-modified polyurethane resin can be used to constitute at least a portion of the binder of a magnetic coating formation...."

In conclusion, Applicants submit that Yasuda discloses a phosphoric-acid-modified polyol, obtained from the reaction between a phosphorus compound and an epoxy compound. (See page 6, lines 52-54 of Yasuda). The modified polyol is then reacted with a bi-functional or tri-functional isocyanate to undergo urethaneation. (See Yasuda at page 7, lines 31-37). Finally, the modified urethane is used as a binder for magnetic particles. (See Yasuda at page 8, lines 53-56.) Thus, the phosphorous compound of Yasuda is understood to be useful for both its capacity to bind with ferric particles, as well as for its capacity to generate hydroxyl functions, which further react with a polyisocyanate to form a urethane resin. The modified urethane resin of Yasuda, however, is clearly disclosed as a solution. (See page 11, line 13 of Yasuda.) Thus, the urethane of Yasuda is a one-phase resin. In stark contrast, however, the emulsion of the present invention is a two-phase emulsion, wherein one phase is a (poly)isocyanate composition and the other is an aqueous phase.

In view of the above distinctions, Applicants submit that one of ordinary skill in the art would not be led to use the phosphoric-acid-modified polyol of Yasuda as an emulsifying agent for the polyisocyanate of Tirpak. In particular, the reaction, processes and final compositions of Tirpak and Yasuda have nothing in common and thus cannot be combined to arrive at the presently claimed invention.

In fact, Applicants submit that Yasuda teaches away from the asserted combination because the disclosed phosphoric-acid-modified polyol reacts with the bi-functional or tri-functional isocyanate to form a urethane solution, which is an entirely different product than that of the present invention. That is, nowhere does Yasuda disclosure or suggest preparing an oil-in-water emulsion of (poly)isocyanate, wherein, when present, a polyhydroxyl compound does not react with the phosphorous containing emulsifier, and wherein the final emulsion comprises a hydrophilic part formed of an anionic function selected from a phosphate, a phosphonate, and a phosphinate, and comprising less than 50%, by mass, of water, as claimed. Accordingly, the asserted combination clearly fails to teach or suggest all of the claimed elements.

In addition, the asserted combination does not reflect a proper consideration of "all words" in the claim. In particular, because neither of the cited references discloses or suggests a process for preparing an oil-in-water emulsion comprising conducting a one-step emulsifying-and-blocking reaction by placing an isocyanate composition comprising free isocyanate functions in contact with at least one blocking agent in the presence of a surfactant, the isocyanate composition being gradually added, and where the content of the free isocyanate is equal to not more than two equivalents per kilogram or a composition comprising a blocked

polyisocyanate emulsion comprises a hydrophilic part formed of an anionic function selected from a phosphate, a phosphonate, and a phosphinate, and comprising less than 50%, by mass, of water relative to the emulsion, Applicants submit that the Official Action has not given full consideration to all of the claim elements, i.e., patentable weight must be given to "a one-step emulsifying-and-blocking reaction," "by placing an isocyanate composition comprising free isocyanate functions in contact with at least one blocking agent A in the presence of a surfactant B and an aqueous phase," "the isocyanate composition being added gradually ," "the content of free isocyanate functions is equal to not more than two equivalents per kilogram of the isocyanate phase," "anionic function selected from the group consisting of a phosphate, a phosphonate, and a phosphinate" and "the composition comprises less than 50%, by mass, of water relative to the emulsion, in Claims 66, 118 and 155 and judging the patentability of these claims over Tirpak and Yasuda.

For at least the above reasons, Claims 66, 118 and 155 are patentable over the combination of Tirpak in view of Yasuda. Because the remaining Claims (67-117, 119-154 and 156-175) depend, directly or indirectly, from independent Claims 66, 118 or 155, Applicants submit that these claims are also patentable over the asserted combination for at least the reasons that Claims 66, 118 and 155 are patentable thereover. Applicants respectfully request reconsideration and withdrawal of the §103 rejection over Tirpak in view of Yasuda.

From the foregoing, Applicants earnestly solicit further and favorable action in the form of a Notice of Allowance.

If there are any questions concerning this paper or the application in general, Applicants invite the Examiner to telephone the undersigned at the Examiner's earliest convenience.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

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By: _____
Martin A. Bruehs
Registration No. 45,635

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620